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(71) Applicant and

(72) Inventor: WHITLOCK, David, R. [US/US]; 40 Nash  
Street, Watertown, MA 02472 (US).

(74) Agent: ANASTASI, John, N.; Lowric, Lando & Anastasi,  
LLP, One Main Street, Cambridge, MA 02142 (US).

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ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.*

(54) Title: METHODS OF USING AMMONIA OXIDIZING BACTERIA

(57) Abstract: A use of ammonia oxidizing bacteria in the manufacture of a medicament and a method for treating a subject who has developed or is at risk of developing at least one of hypertension, hypertrophic organ degeneration, Raynaud's phenomena, fibrotic organ degeneration, allergies, autoimmune sensitization, end stage renal disease, obesity, diabetes type 1, osteoporosis, impotence, hair loss, cancer, aging, autism, and an autism spectrum symptom comprising positioning ammonia oxidizing bacteria close proximity of a surface of the subject, of nitric oxide and nitric oxide precursors using ammonia oxidizing bacteria.

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/31690

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC: C12N 1/00( 2006.01),1/20( 2006.01);A01N 63/00( 2006.01)  USPC: 424/93.4;435/243,252.1 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) U.S. : 424/93.4; 435/243,252.1  Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EAST, CAPLUS, MEDLINE		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/13982 (WHITLOCK) 21 February 2002 (21.02.2002), page 15, line 24, through page 18, line 31; page 21, lines 10-29.	1-8
X	WO 03/057380 (WHITLOCK) 17 July 2003 (17.07.03), page 5, lines 11-17; page 15, lines 19-30; page 17, line 30, through page 18, line 12; page 24, lines 27-32; page 28, line 17, through page 30, line 3; page 41, lines 12-28.	1-8
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
<b>* Special categories of cited documents:</b>		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search 28 August 2006 (28.08.2006)	Date of mailing of the international search report 02 OCT 2006	
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer Lora E. Barnhart Telephone No. 571-272-1600	

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/31690

### Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:  
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
  2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees.
  3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-8
- Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US04/31690

### BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-8, drawn to a method of treating a subject with or at risk of developing any of numerous conditions, said method comprising positioning ammonia-oxidizing bacteria in close proximity to the subject.

Group II, claim(s) 9, drawn to a method of augmenting animal growth comprising removing AAOB from the surface of the animal.

Group III, claim(s) 10-14, drawn to a use of ammonia-oxidizing bacteria in the manufacture of a medicament for providing nitric oxide to a subject with or at risk of developing numerous conditions.

The inventions listed as Groups I-III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: They do not share a special technical feature. The unifying technical feature is ammonia-oxidizing bacteria, which are known in the art (see, for example, Hooper, 1991, U.S. Patent 5,055,193). The expression "special technical feature" refers to those features that define a contribution which each of the claimed inventions, considered as a whole, makes over the prior art. Thus, a feature found in the prior art (in this case, ammonia-oxidizing bacteria) cannot be considered to be a special technical feature. Groups I-III therefore lack inventive unity *a posteriori*.